# EXTENSION

OFFICE OF THE PRINCIPAL
13 NOV 1961

THE FARM AND FARM HOME MAGAZINE October, 1961

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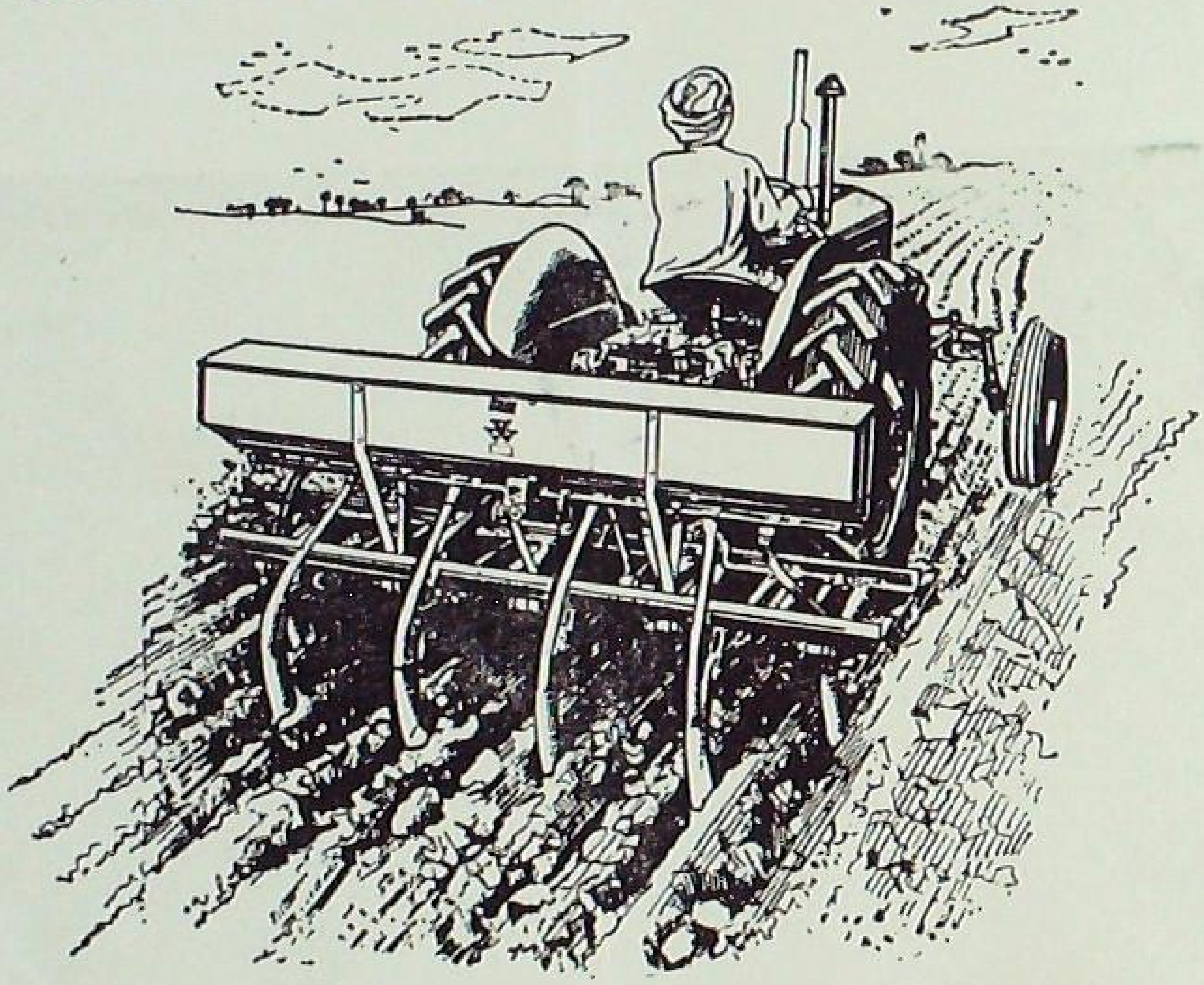

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—Photo by Rajinder Paul

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# EXTENSION

## THE FARM AND FARM HOME MAGAZINE

Vol. October, 1961 No. 4

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**DIRECTORATE OF EXTENSION, MINISTRY OF FOOD AND AGRICULTURE, GOVT. OF INDIA, NEW DELHI**

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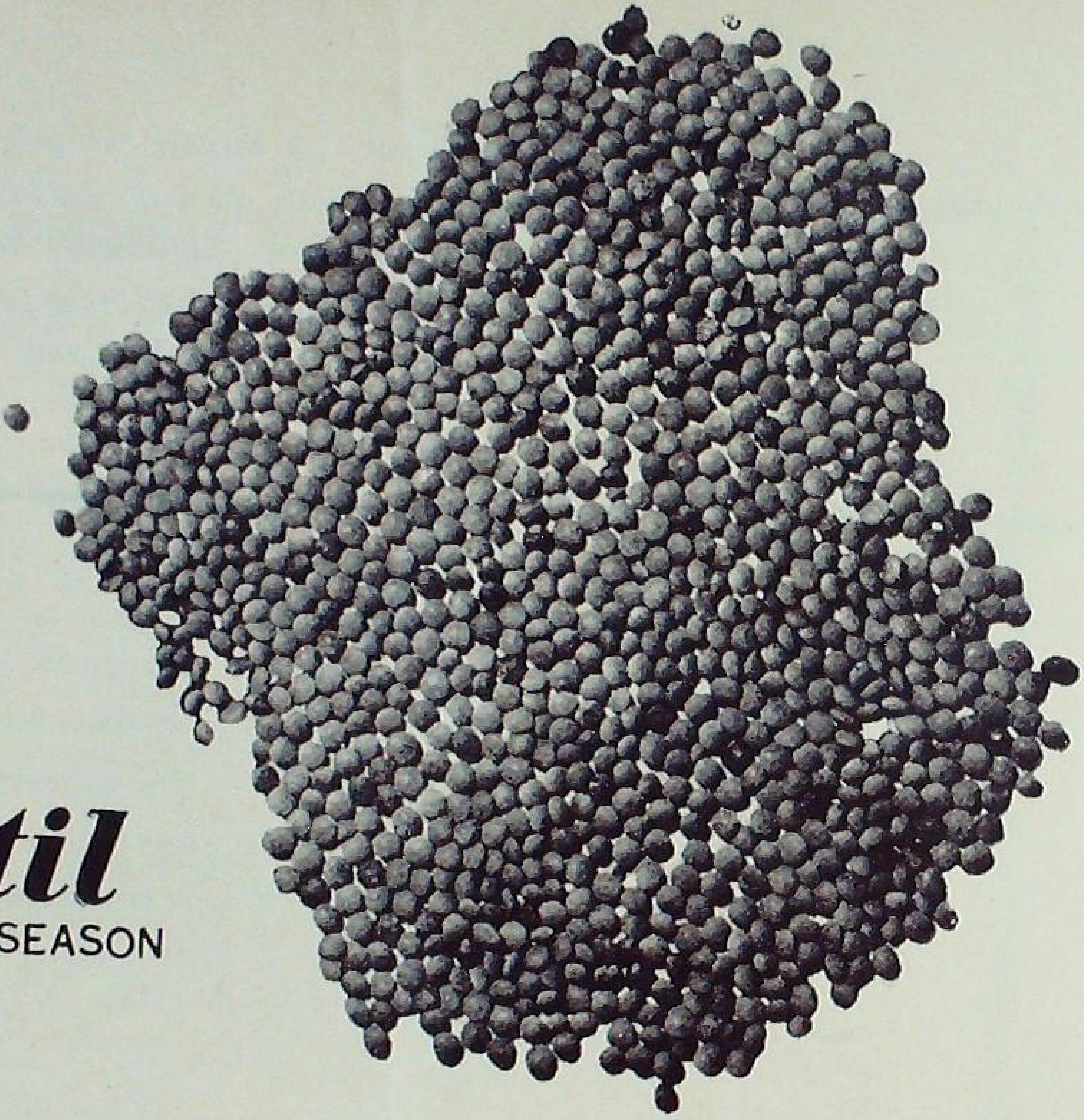


TRY

# Lentil

## AS A SHORT SEASON PULSE

By M.R. PANIKKAR

SEE what you will get if you grow lentil as a short season pulse crop: a good pulse for your family, a good forage crop for your cattle, a green manure for the main crop that follows. All these, at very little extra expense. Hence, try and grow it this *rabi* season.

Whatever be the type of your soil—light loam, alluvial or clay, be it fertile or poor, or even a little alkaline, you can safely put it under lentil. It is a crop that can be grown up to an elevation of 11,000 feet or slightly over. It is one of the most dependable winter season crops under dry farming conditions.

You can grow lentil either as a main crop or as a mixture with other crops after rice, millets or oilseeds.

Growing lentil provides a good rotation. And you know how very important the practice of crop rotation is in better farming.

In the main rice-growing areas, you can raise lentil as a catch crop in the *rabi* season between the main or the successive rice crops. In case you take only one crop after the first rice crop, you can still raise lentil late in the season.

Many farmers in the country rotate lentil with other crops.

*Lower Assam Valley*: *Aus* paddy—mustard—lentil—*aus* paddy or jute.

*West Bengal*: First year: Jute—transplanted winter paddy—lentil (with mustard and wheat)—sugarcane.

*Second year*: *Aus* paddy (*kharif*)—*rabi* crop of the previous year *or aman* paddy—lentil *or* lentil—broadcast *aus* paddy or jute.

*Madhya Pradesh*:
(Northern districts) Rice—wheat or lentil or linseed.

*Maharashtra*: Wheat (irrigated) and lentil in alternate years.

*Punjab*: Maize—lentil
(in dry, light soils and in mountainous and submontane regions)

*Uttar Pradesh*: Late paddy—lentil (*Type 14* and *36*), *or* sugarcane—lentil.

### CULTIVATION

Good preparation of the land, though not usually done by the farmers, will pay you in increased yields. After monsoon rains have stopped, give two or three ploughings and follow with a harrowing. In the black cotton soils, work a blade harrow.

### IMPROVED VARIETIES

Improved varieties give extra yields. Quite a number of improved varieties are available with the State Departments of Agriculture suited to different regions. Some of them are mentioned below:

**West Bengal**: *Type 2, 5, 77, 81* and *94*
**Bihar**: *BR 20, 24, 25* and *37*
**Maharashtra**: *Type 20*
**U.P.**: *Types 3, 9, 14* and *36*

Apart from these, the Indian Agricultural Research Institute has evolved a few high-yielding strains such as *I.P. 11* and *I.P. Hybrid I*

### MIXED CROPPING

You can grow lentil as a mixed crop with rice, barley, wheat, mustard, pea, redgram, castor, etc.

### MANURING

Lentil is a legume. It can grow without any manure. But it is better to apply five to ten cartloads of farmyard manure together with 112 pounds of superphosphate per acre during land preparation.

### SOWING

Sow lentil during October-December when the soil is slightly dry. Otherwise, your lentil will have a quick growth to begin with only to suffer afterwards. You can sow lentil as late as January if you are in the Punjab.

Broadcast the seed or dibble in rows 9 to 12 inches apart. For a pure crop, you need 25 to 50 pounds of seed per acre, while for a mixed crop you will need only half as much. Sowing 50 to 60 pounds of seed per acre in lines 10 inches apart with a spacing of six inches in-between the plants has been found good in Uttar Pradesh.

After sowing the seed, give a light planking to the field. This will press down the soil and help conserve moisture.

### INTERCULTURE

You need not give any interculture to lentil at all. But if your land preparation is not thorough enough, you may find too many *khesari* and *vetch* growing with your crop. In such a case, intercultivate once before the crop starts flowering.

### IRRIGATION

Lentil is mostly grown without irrigation. But where the crop is sown late in the season, irrigate your crop after weeding. This will help in getting you the normal yield.

### DISEASES AND PESTS

Lentil has very few diseases and pests. The only disease that you may come across is wilt. Plants are found to dry up suddenly here and there in the field. The best way to get rid of the disease is to use seed of an improved variety that resists wilt.

### HARVESTING

Lentil will be ready for harvesting in about 3½ months after sowing. You can harvest it by February or March at the latest. Harvest the crop with a sickle when dead ripe. Dry it on a threshing floor for a week and thrash. You can get anything from 6 to 23 maunds of grain and 10 to 20 maunds of *bhoosa* from an acre of land. Your yield will depend on how best you grow it.

*An 11-week-old sannhemp crop*

# A green manure for every field

## AND YOU DON'T DISTURB YOUR FOOD OR MONEY CROP

BY C. HANUMANTHA RAO

FOR over 50 years now, the Agricultural Department in Andhra Pradesh has been helping the State farmers grow green manure crops as a regular farming programme.

This work has resulted in farmers taking up green manuring on a wider scale. Today, in the paddy belt of the Krishna and Godavari deltaic Districts, green manure or green manure-cum-fodder crops occupy 3.5 lakh acres. The total cropped area in these Districts is about 40 lakhs acres, more than half of this being under irrigation. The rainfall here varies from 40 to 55 inches.

Farming in the area is taken up under dryland, wetland and garden land conditions.

Farmers, following the advice of the Department have found that green manuring has helped them improve soil structure and fertility. They also have harvested more grain crops as a result—and all this at a low cost and with a little extra labour. What they have liked more is that they can grow the green manure crop without disturbing either their food crop or commercial crop.

#### DRY LAND AND GARDEN LAND

In January, when farmers sow *bajra* or *ragi* or other minor millets, they also sow sannhemp at 6 to 10 pounds an acre. When sannhemp is in flower, they plough it in after the millet is harvested, thus providing about 2,000 pounds of green matter for the following crop. Or, this may also be cut along with the millet, leaving a half to one foot long stubble. The crop is used as fodder, and the stubbles when ploughed in later provide green manure for the next grain crop.

#### INDIGO WITH TOBACCO

In the alluvial soils, when *desi* tobacco or chilli is grown, farmers sow indigo as an intercrop. When the main crop is about two months old, they use five to eight pounds per acre as seed-rate. No irrigation is given to indigo after tobacco or chilli is harvested. In May, when indigo has grown up 4 to 4½ feet high and is cut, it gives 8,000 to 10,000 pounds of green matter. If left to seed, 350 to 400 pounds of seed can be collected.

#### PILLIPESARA AND JOWAR

*Pillipesara* (at 15 to 20 pounds of seed per acre) is sown mixed with *jowar*. After *jowar* is harvested, the green manure crop is cut for fodder first and then allowed to grow for ploughing in later as green manure. This way, they get about 4,000 pounds of fodder and 3,000 pounds of green leaf per acre.

#### WITH GINGELLY

Gingelly is sown in the main season in June or in January. When possible it gets an irrigation or two. In the June-sown

*Indigo is an excellent intercrop with tobacco or chilli in alluvial soils*

*Sesbania growing on paddy field bunds*

*A mixed crop of sannhemp and wild indigo grown in the alleys of a fruit garden*

gingelly crop, sannhemp alone is sown at 10 to 15 pounds per acre, and by the time gingelly is harvested, sannhemp produces about 3,000 pounds of green leaf per acre for use for the succeeding garden land paddy or other crops. Where gingelly is sown in January after paddy, indigo seed, at five to eight pounds per acre, is mixed with gingelly and sown in the medium type soils. Sesbania and *dhaincha* are sown in heavy and alluvial soils, with 20 pounds as seed-rate. Sesbania and *dhaincha* will grow only four inches high when gingelly is harvested, but will pick up growth and by June will be six to eight feet high.

#### SESBANIA AND SUGARCANE

Sesbania is sown along the sides of sugarcane trenches, with 10 to 15 pounds as seed-rate with the second hoeing and irrigation. By June-end, when sugarcane is earthed up, sesbania gives 8,000 to 10,000 pounds of green leaf per acre. Green manuring thus, it is found, not only reduces the cost of manuring of sugarcane, but also helps in the better setting and improving the quality of jaggery.

#### GARDENS AND ORCHARDS

Cowpea, sannhemp, sesbania and wild indigo are all sown in the alleys of young fruit gardens and coconut gardens, depending upon the type of soil and the following intercrop. Cowpea, sannhemp and wild indigo are sown in the alluvial, light to very light soils, while sesbania is sown in the heavy soils with a seed-rate of 30 pounds to the acre. These yield 6,000 to 15,000 pounds of green matter per acre. In the alluvial soils, turmeric or yam or colocasia or ginger is raised in the alleys of coconut gardens after ploughing in the manure.

#### MINOR PULSES

In dry lands, minor pulses are sown as green manure at 30 to 40 pounds per acre in the first week of June, and are ploughed in a month before the planting or sowing of the succeeding winter crop. The green manure crop yields 4,000 to 6,000 pounds of green matter per acre.

#### WETLANDS

In the case of single-crop wetlands, where the lands are not saline, they raise sannhemp and *pillipesara* for fodder and green manure, besides raising pulse crops where possible. Sannhemp is cut and a hay is made out of it. This hay is fed with paddy straw to cattle. The stubble and roots left behind are added to the soil.

In the case of *pillipesara*, two or three cuttings are taken for fodder, and the last flushes of leafy growth are used as green manure. Pure green manure crops are raised over a lakh of acres.

In double-crop wetlands, sesbania seedlings are transplanted at a distance of nine inches along the paddy field bunds of the first crop of paddy, and the 3,000 to 4,000 pounds of the green matter per acre available are used for the second crop of paddy planted in February.

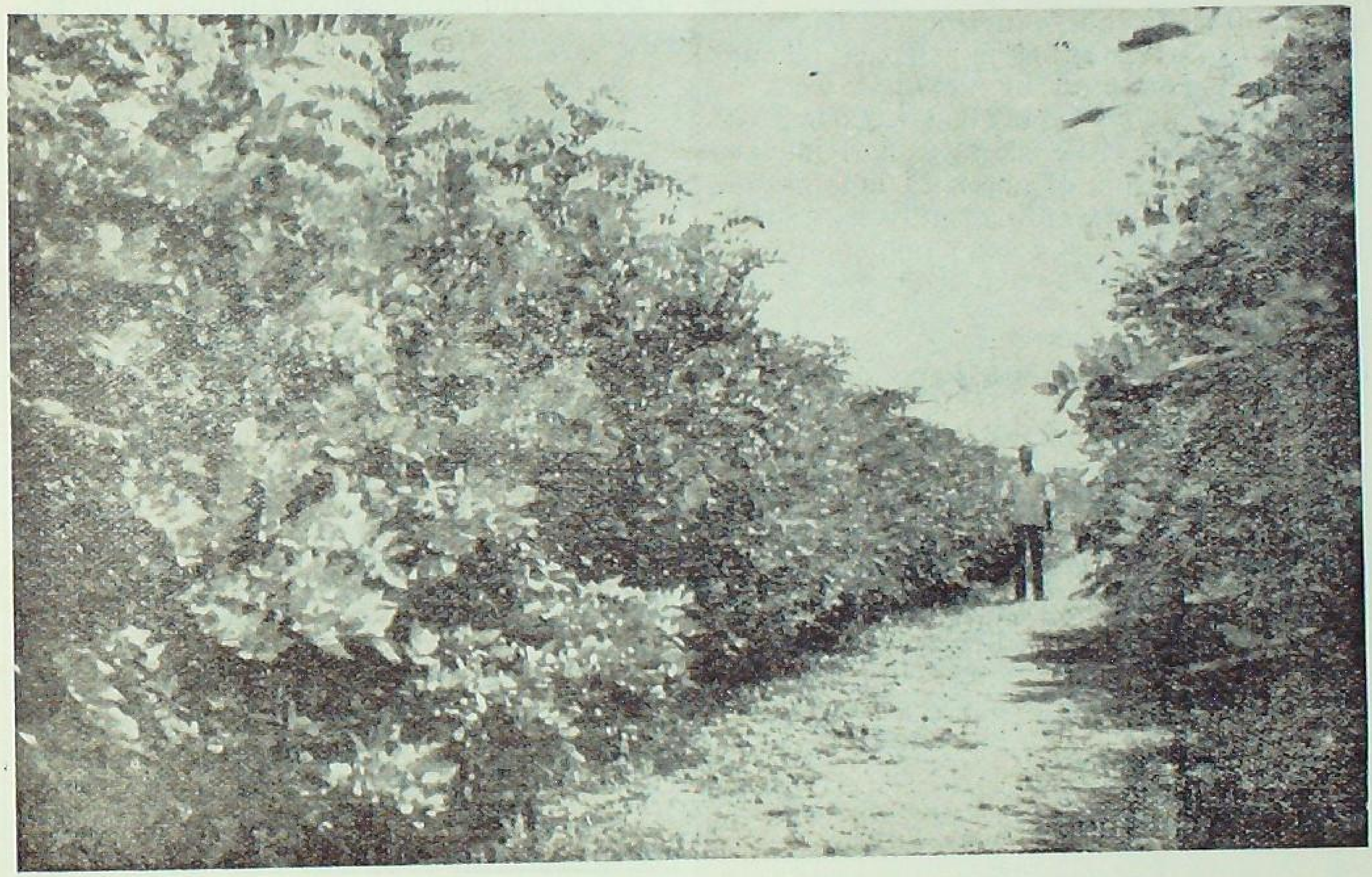
New practices in green manuring, suited to the cropping practices in vogue have been introduced in the wetlands.

#### SINGLE CROP WETLANDS

Sesbania in heavy soils and wild indigo in light soils are sown as mixed crop, with a seed-rate of 30 to 35 pounds per acre, mixed with 30 pounds of sannhemp. The wild indigo seed is treated with hot water to remove the wax coating, which results in an increased germination. By the time the sannhemp is cut for fodder with six inches of the stalk left behind, wild indigo or sesbania will be only four to five inches high. The crop will slowly put on growth helped later by the summer showers. By June, the wild indigo crop yields 4,000 to 6,000 pounds, and sesbania 7,000 to 20,000 pounds of green matter per acre.

#### SESBANIA OR DHAINCHA AS A PURE CROP

Sesbania or *dhaincha* when sown in March-April as a pure crop with 30 to 35



*Glyricidia is a good roadside plant and provides green matter in plenty*

pounds as a seed-rate per acre, gives an yield ranging from 5,000 to 10,000 pounds.

Sannhemp is sown at 40 pounds per acre in areas where there is no water stagnation after the harvest of the short-duration first crop in October-November. The crop will be ready for turning in as green manure for the second crop by the first week of February with an yield of about 6,000 to 8,000 pounds. Where there is only a short interval between two crops of about 2½ months, no other green manure crop can grow as quickly as sannhemp, giving a green matter that is sufficient for manuring two acres.

#### GREEN MANURE IN STANDING CROP

As in the case of the first crop, either *dhaincha* or sesbania is sown with 30 to 40 pounds as a seed-rate in the standing second crop of paddy, a week before harvest. One good irrigation has to be given to the second crop of paddy two weeks before the harvest to see that the green manure seed germinates well. This green manure crop yields 6,000 to 8,000 pounds of green leaf per acre.

#### PLANTING ALONG BUNDS

Transplanting one month-old sesbania or *dhaincha* seedlings in the last week of February after the second crop of paddy has been planted and at a distance of six to nine inches along paddy field bunds, results in farmers getting a yield of 2,500 to 3,000 pounds of green matter. The yield will be of course less than what is got when planted with the first paddy crop. *Dhaincha* will grow in saline soils if it is continuously grown for three years, even if it does not show much of growth during the first two years.

Glyricidia is now being planted on a large scale on the wider paddy field bunds which are not used for carrying sheaves or for raising fodder or pulses. Since glyricidia does not fare well in saline areas, *Ipomoea cornea* is now being grown instead. This crop yields 15 pounds of green matter per plant in one year. If cuttings ⅛ to 5/8 inch thick and nine inches long are planted in a slanting position with six inches of it buried in the soil, exposing just about two inches of it above ground, 90 per cent of them will set root. *Ipomoea cornea* also resists drought.

Farmers have thus a green manure for every type of cropping pattern they follow; and green manuring is certainly helping them get better yields from their cereal and pulse crops.

*We welcome your*

**Questions and Suggestions**
**Address them to**
**EDITOR**

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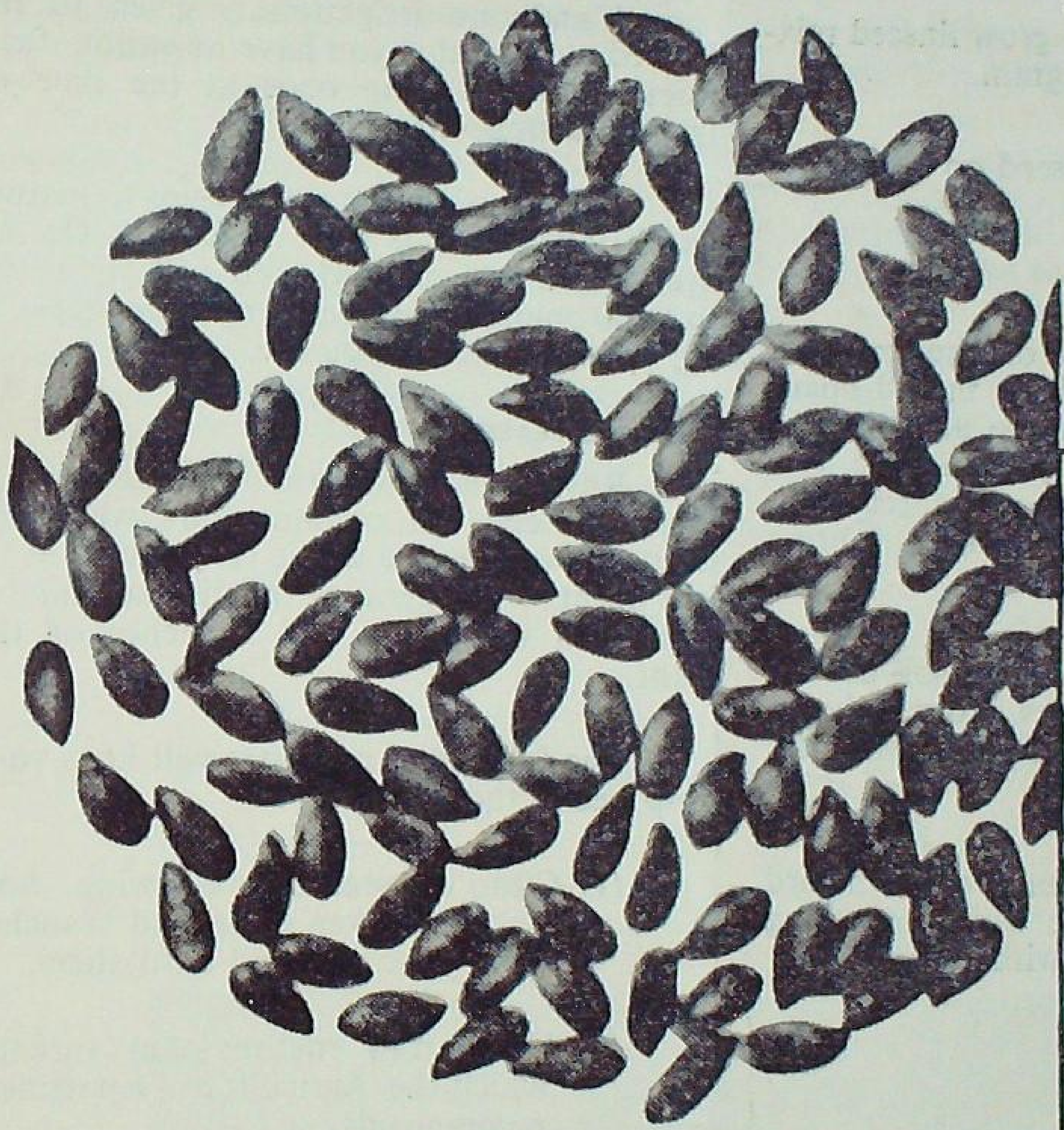
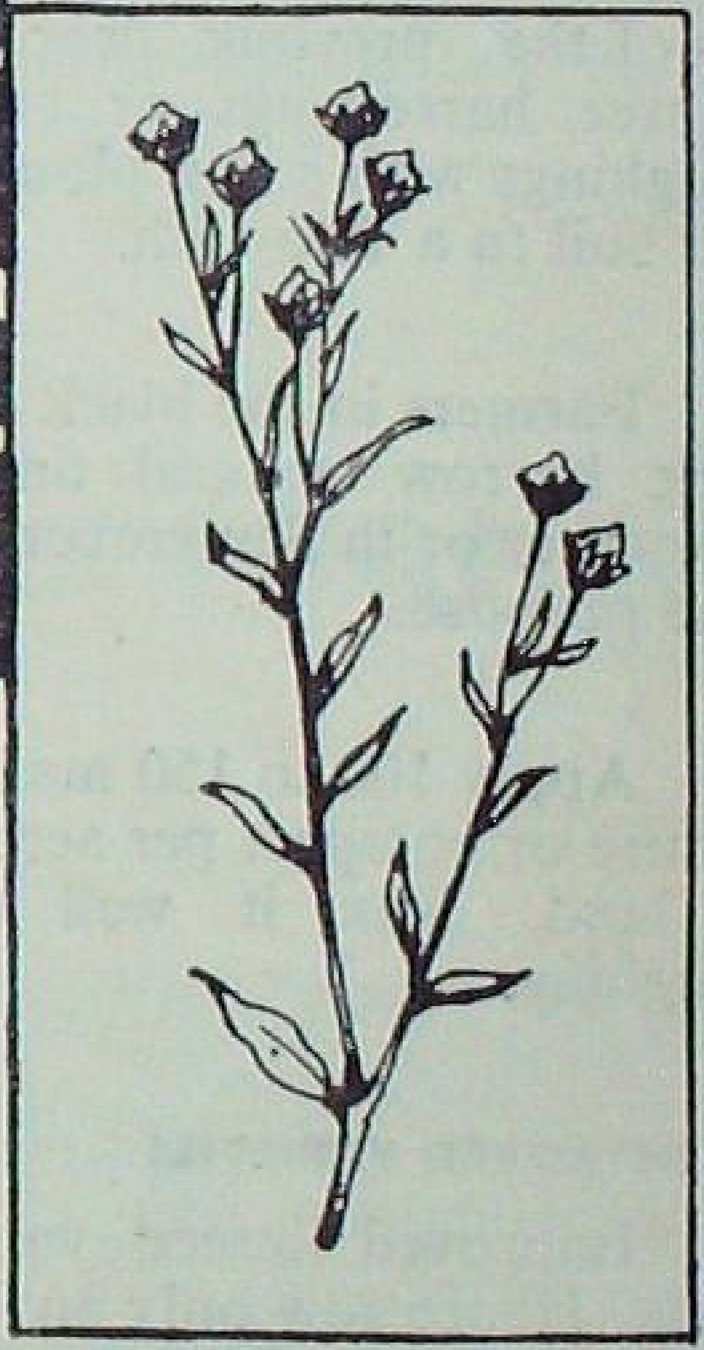
## *FILMS ON LOAN*

The Farm Information Unit of the Directorate of Extension has a library of films and filmstrips on Agriculture and Home Science subjects. Membership is free. These films are given on loan, free of charge, to members of the library. For details regarding membership and films and filmstrips available, please write to the Librarian, Farm Information Unit, Directorate of Extension, Krishi Bhavan, New Delhi-2.

# GROWING LINSEED – pure or mixed

...is done better with these tips on improvement





THERE is always a better way of growing a crop ; it is so with linseed too, whether you grow it as a pure crop or as a mixture with others.

And taking up the improved method for linseed-growing pays, as linseed has such good demand in and outside the country.

Linseed will grow in many types of soil, but see that you don't grow it in alkaline or sandy soils. It needs moisture to grow, but does not like water-logging. Clay loams and black cotton soils are very good for linseed.

It is a *rabi* season crop.

#### AS A MIXTURE

As a mixture, you can grow linseed mixed with gram.

Sow linseed in the third week of October in lines nine inches apart behind the plough. For every row of linseed, sow three or four rows of gram. This way, you will need 5 seers of linseed and 25 seers of gram as seed for sowing an acre.

If you are raising an irrigated crop, apply also 40 seers of superphosphate per acre behind the plough.

In the South, you can grow linseed mixed with wheat or *jowar* or gram.

You can also raise linseed on borders of wheat and barley fields.

#### PREPARE THE LAND

Soon after the harvest of the previous crop, plough the land with a mould-board plough twice or thrice. Remove all the stubbles of the previous crop. Then give two or three harrowings or two or three light ploughings with a *desi* plough. This will bring your soil to a fine tilth.

Farmers in the black cotton soil use the blade harrow several times from July to September or in September-October, with the same purpose.

Apply 100 to 150 maunds of farmyard manure or compost per acre while preparing the land. Mix it well with the soil by ploughing.

#### USE IMPROVED VARIETIES

Improved linseed varieties give better yields. Hence sow only an improved variety. Your State Department of Agriculture will have an improved variety suitable for your land. Get the seed through your Agricultural Officer or Gram Sevak.

#### SOW IN TIME

Sow the seed in October when the heavy rains are over and the soil is sufficiently moist.

Drill the seed 1½ to 2 inches deep in rows 9 to 12 inches apart. Use a seed-rate of 12 to 14 seers per acre. In the case of varieties with bold grains, you will need a little more seed. If the soil is poor, use a higher seed-rate of 16 to 18 seers per acre.

The seed sprouts in about five days. Intercultivate the crop-rows after three weeks of sowing to remove the weeds.

Usually no irrigation is given to the linseed crop. But if you have irrigation facilities, you can irrigate once at the time of fruiting with profit.

Harvest when the crop begins to mature and before the fruits start shedding. On an average, an acre of good crop will yield 800 to 1,000 pounds of seed or even more, depending upon the variety you use.

#### LINSEED DISEASES

Rust is the most serious of diseases that attack linseed. In certain years when the disease is severe, the whole crop looks as if it is burnt. The germ of the disease remains hidden in the stems and branches of the plant.

The following measures will keep your crop free of the disease :

(1) Clean the seed before sowing. Sort out the broken stems and branches from your seed and burn them.

(2) Use seed of rust-resistant varieties which the Agriculture Department recommends.

Occasionally linseed plants are seen to dry up suddenly here and there in the field. This is due to another disease called wilt. The disease is carried through the soil. Do not sow linseed in fields which have shown wilt infection because the infection persists for several years.

#### LINSEED PESTS

Caterpillars (semiloopers) eat away the leaves of the linseed plants. They thus cause at times a good deal of damage.

Dusting five per cent BHC at the rate of 15 pounds per acre or spraying 0.25 per cent DDT emulsion at the rate of 60 to 80 gallons an acre will control this pest.

D.N. KHERDEKAR

WHENEVER you need to make bunds—either for conserving soil or water for irrigation—don't do it with manual labour. Use a bund former.

This implement not only does the work better, but also cheaper.

It consists of two sheet metal blades so fixed that at the front the implement has a bigger opening than at the back. As such, when you pull the implement forward, it collects the loose soil from a wider area and when the same passes through the back end, a small bund (six to ten inches high) is formed.

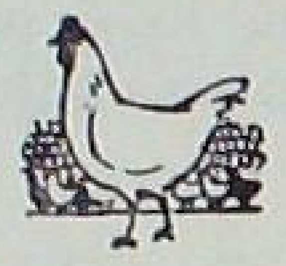
Some bund formers have foot-rests fixed to the blades, on which a farmer can stand and help press down the implement. You can also adjust the height of the beam.

You can have the bund former in three blade sizes—2½ feet, 3½ feet and 5 feet. The weight varies from 30 pounds to 110 pounds, and the cost from Rs. 35 to 85.

It is cheap to form bunds with a bund former. As against Rs. 7 you have to spend for putting up bunds in an acre if you employ labour, the bund former can do the same work for you in Rs. 1.50.

# *The job is easy with a* **BUND FORMER**

# POULTRY LEAFLETS



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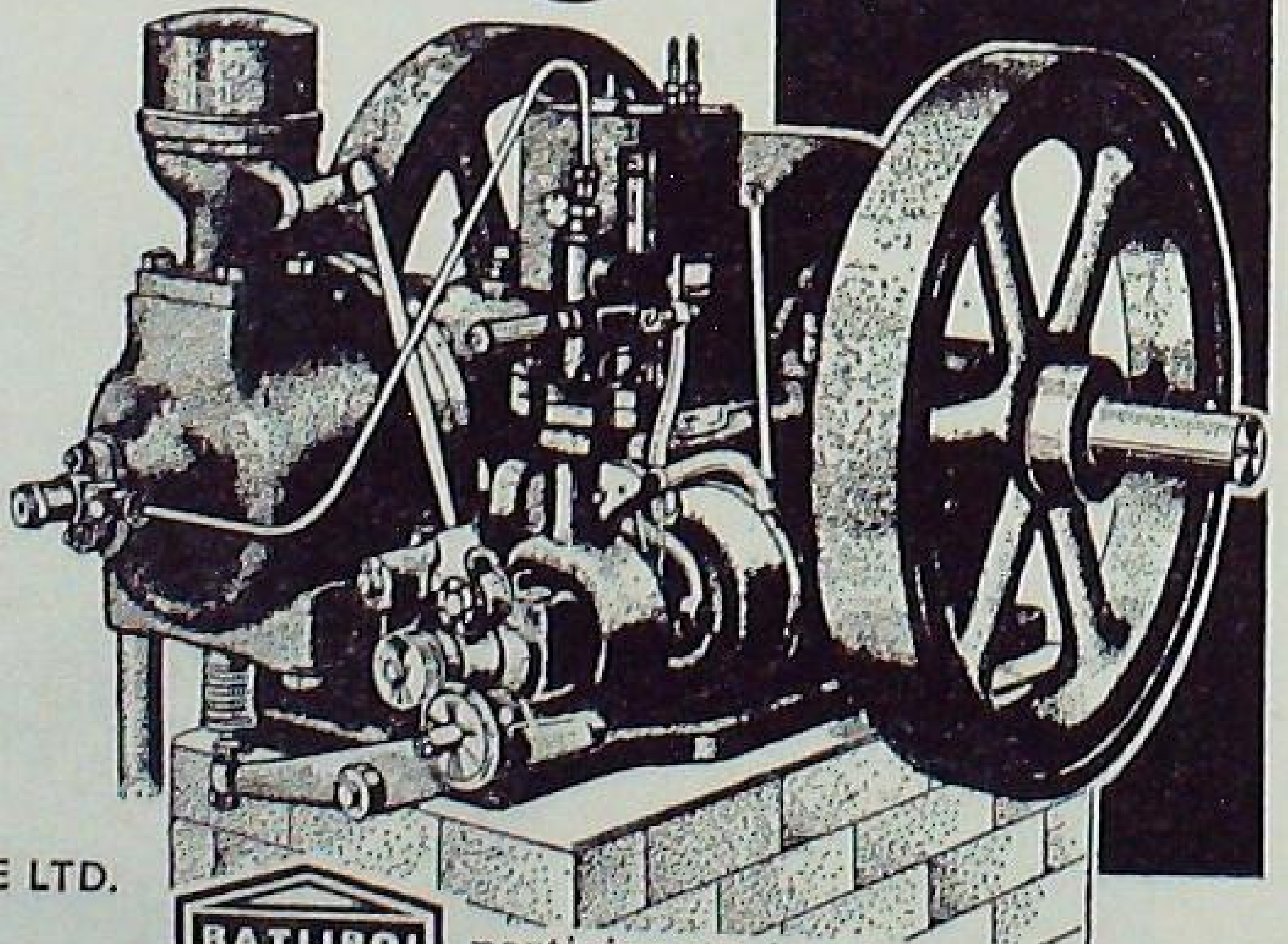
**AJEET OIL ENGINE**



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DBY-32A

# YOU CAN HAVE blight-free POTATOES

By D. BAP REDDY

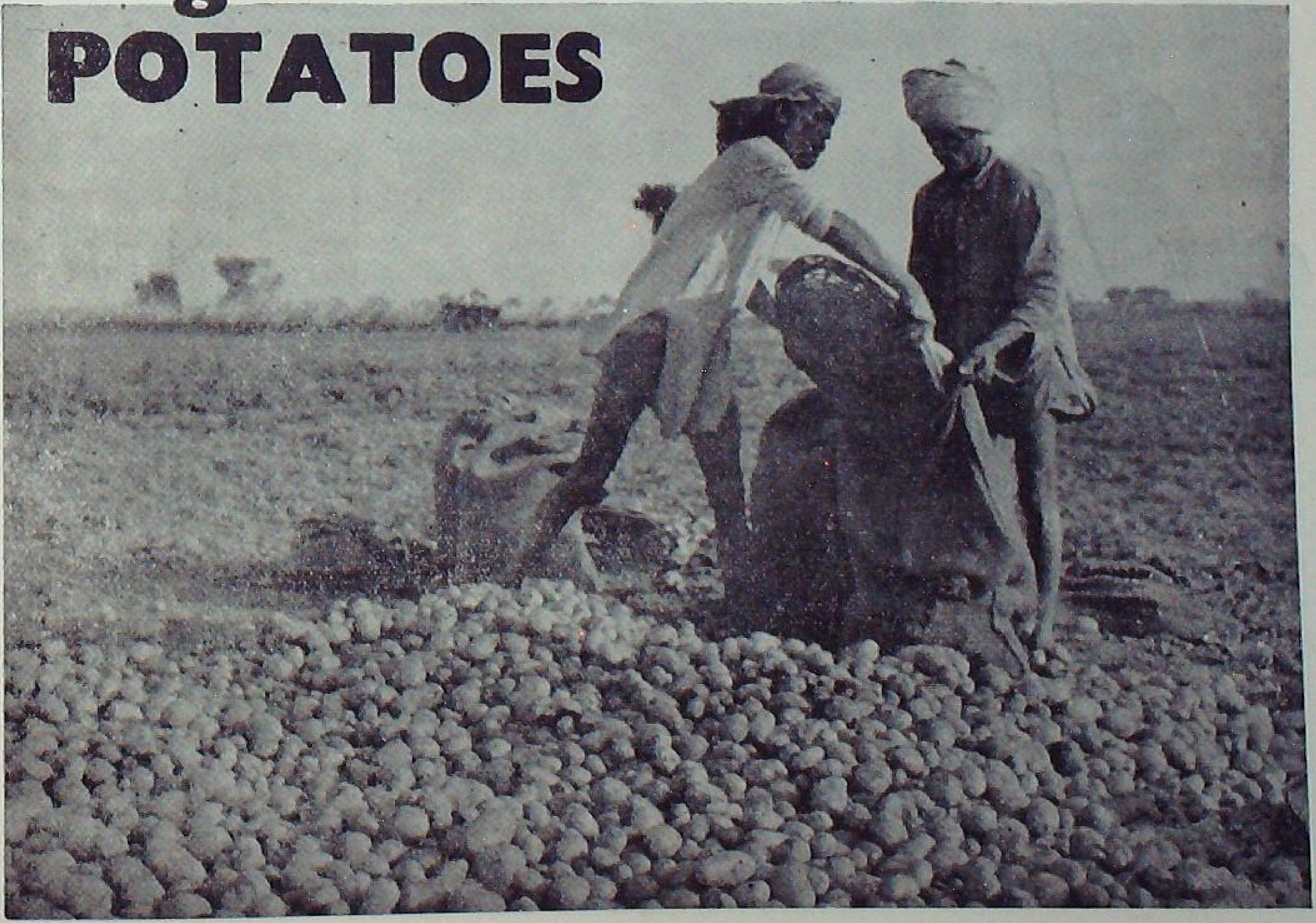
YOU can have a blight-free potato crop, even where both the blight diseases—early blight and late blight—appear.

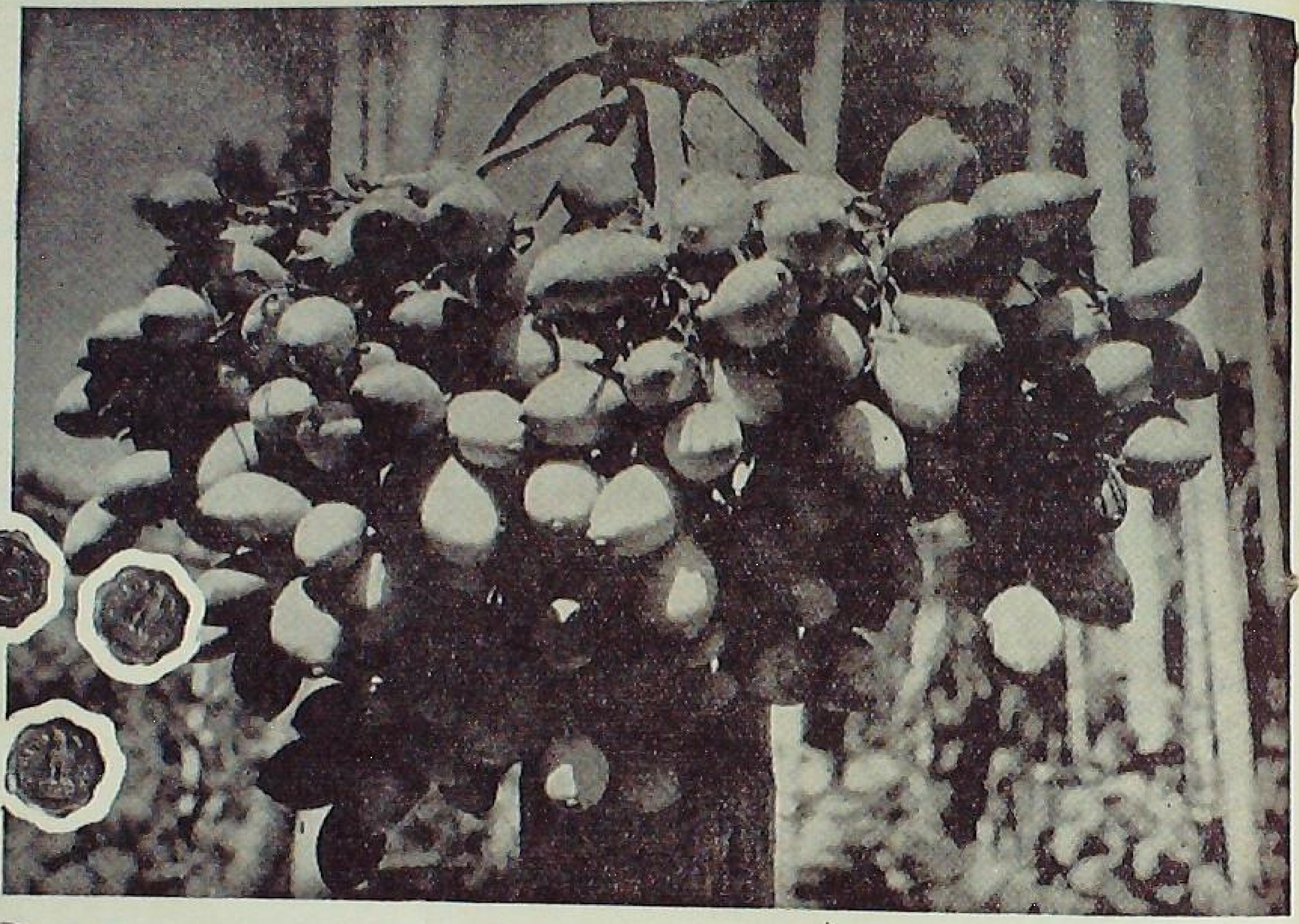
This you can do by giving timely sprayings with Bordeaux mixture.

When early blight appears in your potato field, you will see small brown spots on the leaves, mostly on the tips and the margins. Later, these enlarge in size, and develop into two or three rings of different shades. When the disease is severe, leaf stalks, stems and tubers are affected.

Late blight attacks potato, late in the season. At first you will see small black patches on the leaves, sometimes covering the whole leaf. When the weather is moist and cool, the disease becomes more serious, and even the stems and the tubers get affected, and sometimes the plant dies off. Diseased tubers show a brownish colouration and rot in storage, and in the soil too

(*Continued on page 21*)





# There is cash in **ARECANUT**

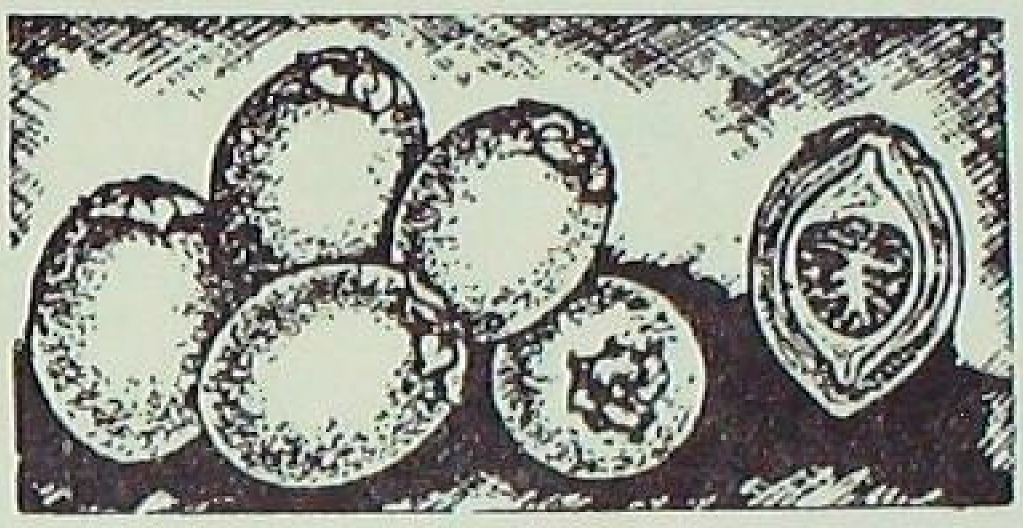
*and a few more things done to the crop will mean more money for you*

**By M.C. NAYAR**

ARECANUT is a very paying crop. If you want to grow some areca trees in your garden, you will need to know how best you can do it. If you are already growing arecanuts, you still need the tips which can help you grow a better crop and increase your profits.

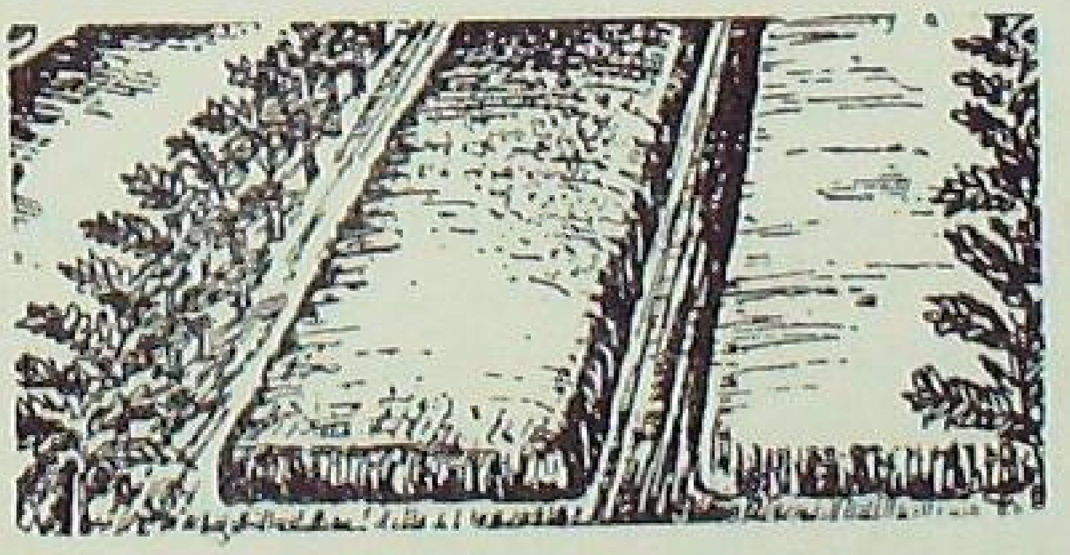
Areca is a tropical crop. It requires a soil which is well drained. Areca needs plenty of water too. Hence, you can grow it well in areas of heavy rainfall. Even here, it will mean more profits if you can irrigate the crop during the summer months.

#### START WITH GOOD SEEDS



Areca being a perennial plant, carefully select your seednuts. Collect nuts for growing from healthy, high-quality trees 25 to 45 years old. Nuts of the middle bunches make good seeds. Lower such bunches with a rope when fully ripe, and select the well-developed nuts from these. Sow them in a specially-prepared nursery.

#### PEPARING THE NURSERY



Select a shady place near the well or any other irrigation source for the nursery. Dig the whole area about nine inches deep. Add some river sand two to three inches thick over the nursery. Sow the seeds on this sand bed, with the stalk-ends up. Cover the seeds with the top-soil. Better spread a little straw also over the beds. Water beds regularly with a rose can.

After three months, remove the seedlings from the beds and plant them 12 inches apart in raised beds in a shady place. Allow the seedlings to grow for a year in these beds, and then select the healthy ones for planting in the main field. If you find it hard to grow your own seedlings, get the seedlings you need from your Block Development Officer or local Agricultural Officer.

#### PLANTING THE GARDEN

Dig pits 2½ feet cube, with a spacing of 10 feet between plants and rows. Fill up these pits with a mixture of cattle manure or compost and top-soil. Plant the seedlings in the centre of the pits and trample the soil all round the seedlings.

You can raise areca as a pure crop on a plantation scale, or as a mixed crop with coconut and other garden crops, or along the boundaries of garden crops. Whatever be your system, let your areca palms get sufficient water. but see to it also that the field is not waterlogged. See that you can provide water to the palms during the dry months, and also that the field is properly drained during the monsoon period. If you dig the necessary channels during the summer months, you can use these for proper drainage during the heavy rains and for irrigation during the summer.

#### MANURING THE PALMS

Give good quantity of organic manures like cattle manure, green manure and compost to your areca palms. Better grow a green manure crop in the garden itself, to be

*A well-maintained arecanut garden*

ploughed in later. You can get seeds of green manure crops like *Sesbania*, *Calopogonium*, *Crotalaria* and sannhemp from your seed-dealer or from the Block Development Officer or from the Department of Agriculture. Sow the seeds in the field, at 15 pounds per acre, in September-October or May-June. When the green manure plants start flowering, pull them out and add them to the garden soil.

Give each arecanut tree a dressing of 40 pounds of green manure or compost or cattle manure, and half a pound of superphosphate, half a pound of ammonium sulphate and quarter pound muriate of potash. Add the organic manure in basins dug round the tree during July-August, and cover partly. When the heavy monsoon is over, apply the fertilizers in the basins, and cover them completely. Ready-made arecanut mixtures are also available these days in the market. You can use these instead of separate fertilizers. The firms which prepare them tell you how and when to use them.

#### ARECA ENEMIES

Some insect pests and certain diseases attack areca. Among the insects, mites are a serious pest. Spraying wettable sulphur, 5 ounces in 10 gallons of water, or 'Folidol', an ounce in 15 gallons of water, will kill the pest.

The fruit rot or *mahali* is the most important among the diseases. When this disease appears, nuts fall off prematurely. Control the disease by spraying the palms with Bordeaux mixture at least three times during the monsoon period.

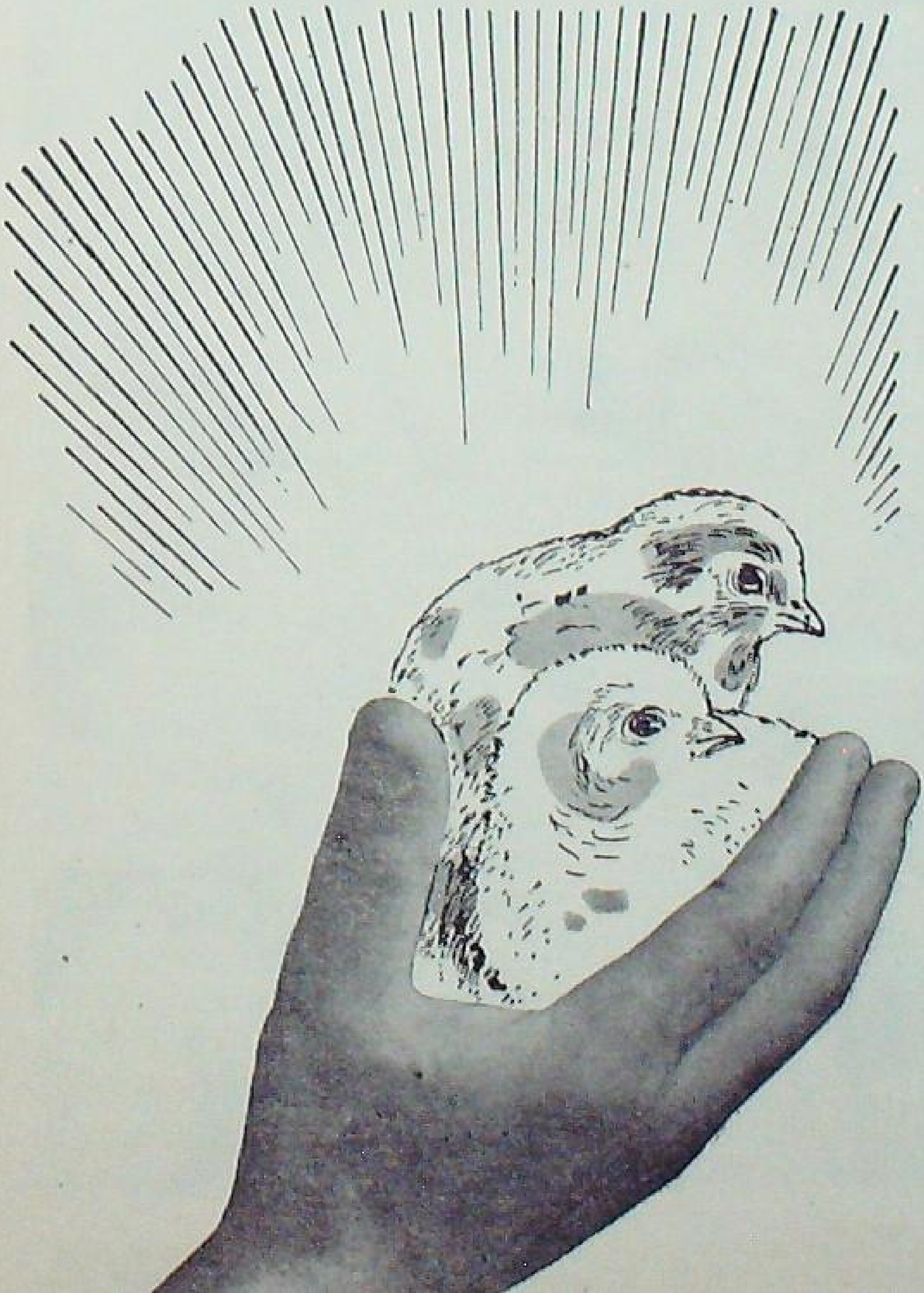
Give these tips a trial in your garden. They will help you grow more areca and thus get more profits.

# Better RAISE your own CHICKS

By S.G. IYER

A CHICKEN'S paying life is her first laying year. You don't expect a pullet which lays, say, 200 eggs in the first year to give you more than 160 eggs in the second year. Normally, egg production goes down by 20 per cent in the second, and in the following years.

A good poultryman, who wants to make poultry-keeping pay, keeps a fairly good number of pullets, and adds new ones to the flock each year to replace those which have finished their best laying period, and those which have died or are sold off.



Many poultry-keepers buy grown pullets from outside to make up the flock number. But this is a costly way of doing it. It is more paying if they hatch the eggs and rear their own birds.

Even if you are keeping but a few birds as a hobby, you will like breeding, hatching and rearing your own birds.

### BREEDING BIRDS

To get first-class hatching eggs, you must have good, strong and healthy birds of the right strain, and rear them well.

You have also to give them a well-balanced ration. Such a ration should contain an animal food like fish-meal, meat-meal or offal or some form of milk, so that the eggs laid may hatch well. You have to give the birds a sufficient quantity of riboflavin and vitamin A. These they will get if you feed them with at least two ounces of fresh green food each in the breeding pens daily. They will also need sufficient calcium, which you can give in the form of sea or river shell or broken limestone. Lime will make the eggs strong-shelled.

Don't allow your breeding stock to become too fat. You will get the best hatching

results if you provide the birds with sufficient run space. A breeding pen for a dozen birds needs at least 200 square yards of run space.

#### SELECTING HATCHING EGGS

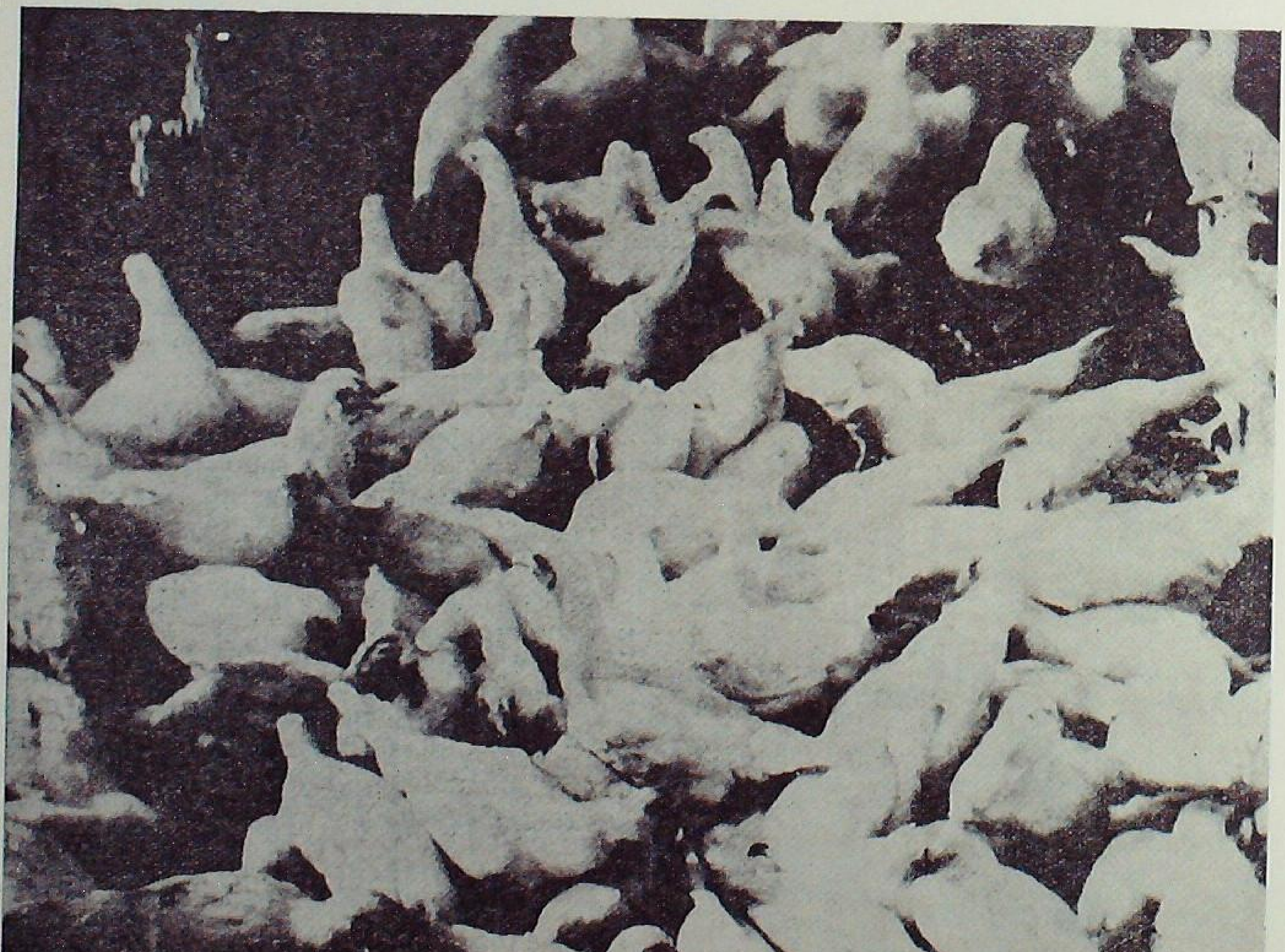
Select your hatching eggs carefully. The quality of the chick hatched depends very much on the kind of egg you hatch.

Select eggs of a good size for hatching. Small eggs will give small chicks, which in turn will produce only small eggs. With improved breeds, select eggs weighing at least two ounces each. Though certainly it is desirable to have the flock producing eggs of a large size, you should not aim at getting very big-sized eggs, as the laying of very large eggs throws too much strain on the birds, which may lead to certain diseases. Again, eggs which are much larger than normal for the breed do not hatch as well as the normal-sized eggs.

Never use cracked or weak-shelled eggs for hatching. It is a good policy to candle the eggs before setting them, as in doing so you will find small cracks which you would otherwise have missed. You can easily make out such cracks by tapping two eggs together. Cracked eggs give a dull sound, while good eggs give a resonant sound.

Don't wash dirty eggs in water before setting. If you do, it will open up the pores

*To get good pullets like these, select your hatching eggs carefully*



in the shell and you will get poor hatching. If the eggs are very dirty, scrape off the dirt with a knife.

Collect your hatching eggs from the nests several times a day, and store them in a cool, moist place. How long you can store these eggs before setting depends largely on how you store them. Do not store eggs unnecessarily, as storing them even for a few days will make them poor hatchers. In hot weather they may be kept for seven days. The best storage temperature for hatching eggs is 55°F.

If you are not storing eggs for more than seven days, you need not bother in what position you keep them. It is safer, however, not to store them with the pointed end of the egg up. You need not turn the eggs during storage.

#### NATURAL HATCHING

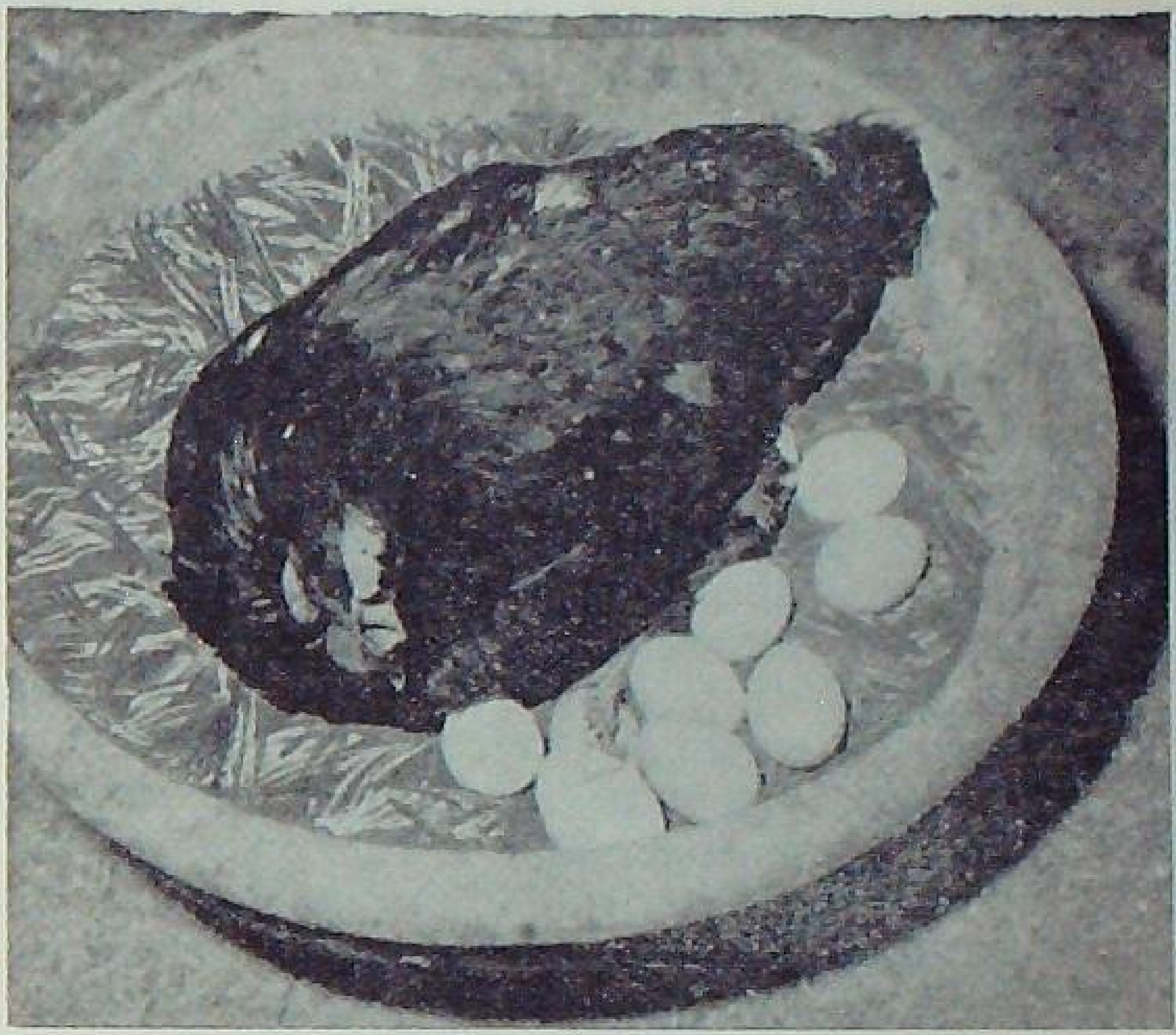
If you are keeping a small number of birds, you can hatch and rear your chickens under hens. Incubators are practical when you have to hatch more than 100 eggs each season.

Make the nest of fine, soft, hay, straw or leaves, and roomy enough, and place it in a cool, shady place free from ticks, and near the ground so that the hen can enter it easily. Find out if the hen is broody by placing her on a dummy or cheaper egg for a short period (24 hours). Set the hen just as it is getting dusk. The average *desi* hen will only cover eight to nine two-ounce eggs.

Give the sitting birds clean cold water twice daily, and enough of whole grains and calcium. Avoid green and sloppy foods of all kinds as they will tend to produce loose droppings, which will soil the eggs.

#### ARTIFICIAL INCUBATION

For large-scale production, it is better to take to artificial incubation. This will reduce labour and will enable you hatch eggs as and when you require them. The incubator will help prevent disease infection.



*For natural hatching, make the nest roomy and comfortable for the brooder*

Incubators give as good, if not better results as hens give. These vary in size from small machines holding 25 eggs to giant machines holding many thousands of eggs. There are two classes of small machines : one run with hot water and the other with hot air. The hot water machines are costlier, but not very much better than the hot air ones. Hence, better use the cheaper type.

Assemble the incubator as per the instructions given by the manufacturer.

To get the best results from your incubator, place it in a separate room, where you can have equable temperatures. If the temperatures during the day and the night vary widely, it will be difficult to run the incubator at an even temperature. The windows should not be exposed to the direct rays of the sun, and the room should be well ventilated.

Test the thermometer of the incubator at the start of each year's operations against a good clinical thermometer. Place both these thermometers in water at 103°F, and see if

they record the same temperature. The capsule should also be tested each season by placing it in water at a temperature of 103°F. If the capsule fails to expand when placed in the warm water, better buy another.

At the beginning of the season, run the incubator at the desired level for at least two days before setting the eggs. Adjust the thermometer in the egg compartment, so that its mercury bulb is just in level with the top surface of the eggs. The position of the bulb is very important in all except 'force draught' machines which have a uniform temperature throughout. In all other types, the temperature recorded varies according to the level of the thermometer. The instructions given by the manufacturer should normally be followed in operating the incubator, in regard to aeration, temperature and moisture content.

The embryo in the egg needs enough oxygen to develop. Hence, ventilation is necessary. Too much of aeration, however, is harmful. For it takes away too much of the carbon dioxide given off by the eggs from the egg chamber which will prevent the transfering of the calcium of the egg shell to the developing embryo.

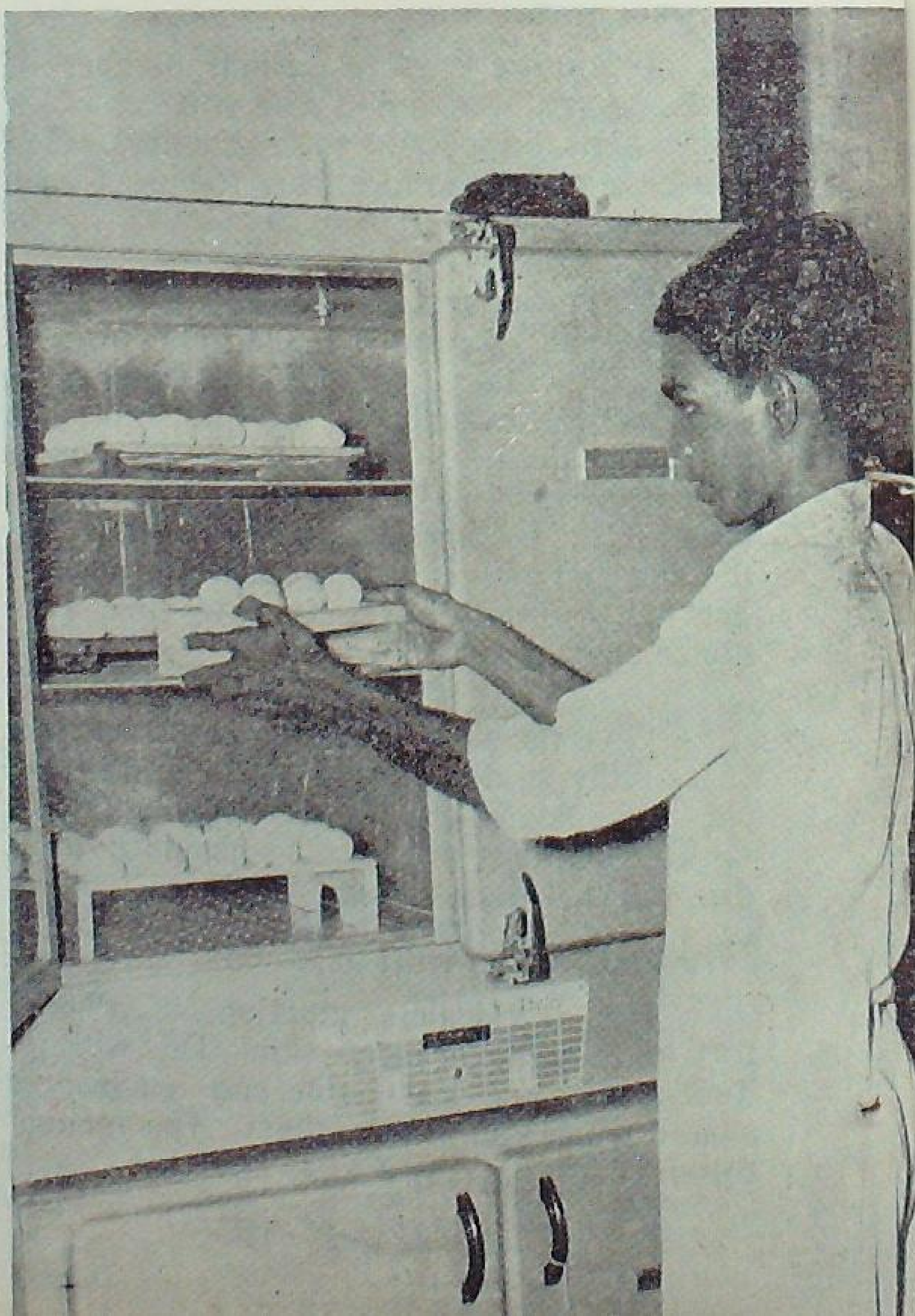
There should be sufficient amount of humidity inside the machine to prevent too much of moisture being lost from the eggs. You will get good incubation results with relative humidities ranging from 40 to 60 per cent. But those much below 40 per cent or over 60 per cent, lead to bad results. There is no danger of too much humidity excepting during the monsoon months. During the dry months you can have better results by providing more moisture. In dry weather, the humidity can be raised by flooding the floor of the room with water, or by placing the incubator over special trays filled with water or wet sand.

In small machines, incubate the eggs always on their sides. Many poultry-keepers mark opposite sides of the eggs at the time of setting so that it makes turning easy. Starting on the third day, turn the eggs each day until the fifteenth day of incubation. Most poultry-keepers turn the eggs until the eighteenth day, but turning after the fifteenth day has no special value.

Recent experiments have also shown that frequent daily turnings improve the hatching results, but with small machines it is usually not practical to turn the eggs more than twice or thrice daily. With self-turning devices on the egg trays, very good results can be had with three turnings a day. Cooling the eggs at any stage of incubation is unnecessary.

Test the eggs on the seventh day for infertile eggs or dead embryos, and remove such eggs. The fertile egg under the candling lamp at this stage shows a small

*Go in for an incubator, if you have a large number of eggs to hatch*



dark spot with radiating blood vessels. The infertile egg, on the other hand appears quite clear. The dead embryo has either a blood ring or a much reduced embryo spot. Candle the eggs again on the eighteenth day to remove all dead embryos.

Don't open the incubator after the eighteenth day until the hatch is practically completed. Once the chicks commence to hatch, darken the incubator, so that they may not all crowd at the front. You need not use the hatching trays unless there is an exceptionally good hatch. Many poultry-keepers remove all the dry chickens and the empty egg shells when 75 per cent of the hatch is over. This gives the remaining eggs more space to hatch.

After the hatch is fully over, clean the incubator thoroughly. Disinfect the same in and out, with a three per cent solution of Dettol.

The percentage you get of the fertile eggs that hatch depends on the use of strong vigorous, breeding stock, hatching at the proper season, and a sound management of the incubators. If you are a good poultry keeper, you should get 75 to 80 per cent of the fertile eggs to hatch during the months of November to March.

### BLIGHT-FREE POTATOES

(*Continued from page 13*)

if the land is very wet when the disease comes.

The way to get over blight is to spray Bordeaux mixture 5: 5: 50 two weeks after the plants have come up, and continue spraying at an interval of 10 to 15 days till about a month before the harvest of the crop, where both the blights occur. If you have trouble from jassids also, spray DDT 50 per cent wettable powder at one pound in 30 gallons of water together with Bordeaux mixture.

You can also use other copper fungicides or organic fungicides like 'Zineb' (Dithane) for potato blights.

If you need any help in preparing Bordeaux mixture, identifying or controlling the blight diseases, contact your Gram Sevak or the Agriculture Officer.

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## Next time you make

# Bordeaux mixture

MAKE AND USE IT AS IT SHOULD BE MADE AND USED

By D.B. REDDY

WHEN you are advised to use Bordeaux mixture against a plant disease, you are also given a formula such as 5:5:50 for preparing it.

The first number in the formula stands for the quantity (in pounds) of copper sulphate you have to use, the second for the quantity of lime and the last for the quantity of water in gallons. The formula 5:5:50 is what you are asked to use against many crop diseases.

Other similar formulae are: 4:4:50, 3:3:50 and 2:2:50.

To make Bordeaux mixture, you need blue stone (copper sulphate) and lime (unslaked or freshly burnt lime-stone). If you want to prepare a good mixture, you need good quality copper sulphate and fresh unslasked lime. Where you can't get unslaked lime, you can use hydrated lime, but the quantity you have to use is 1½ times that of copper sulphate.

You also need three earthen vessels and two small and one big *ghara*.

This is how you make Bordeaux mixture.

First, weigh the quantity of copper sulphate you need. Dissolve it in a small quantity of water. This becomes easier if you powder the copper sulphate, or wrap it in a gunny and steep it overnight in water.

Important: Use an earthenware vessel or wooden tub, but not a metal container like the bucket.

Next, weigh the needed lime. Slake it, mix well in a small quantity of water. Stir well to bring all the lime into solution.

Add water to both the solutions till the required volume is reached.

Strain the solutions before mixing them with a cloth or a strainer to remove any undissolved particles or stones.

Pour both the solutions slowly together into the third, larger container. You can also pour the copper sulphate solution into the lime solution. Stir well with a wooden stick while mixing the solutions.

The mixture is now ready for use.

If you want large quantities of Bordeaux mixture, it will be easier and better to prepare concentrated solution of copper sulphate and lime and then diluting them to the required formula.

1
2
3
4
5
6

If you add one ounce of oil or brown sugar for every five pounds of coppe sulphate, the mixture will stick better on the plants when sprayed.

If you are applying Bordeaux mixture on plants having a smooth surface, add resin. Normally, one pound of washing soda and two pounds of resin in one gallon water are added to 24 gallons of the Bordeaux mixture. This you prepare by dissolving soda in warm water and then adding the resin to it and boiling the whole mixture for an hour.

**TESTING BORDEAUX MIXTURE**

If you have prepared the Bordeaux mixture well, it will be harmless to plants. But, if the mixture contains less of lime and free copper, then it is harmful to them. Hence, better test the mixture to see if it is safe for use.

If you dip any bright or clean iron surface like a clean nail, key or a blade of a knife in the mixture for a minute, and if there is no brown cover on the surface, the mixture is safe for use. If any brown colour does appear, it means there is more of copper in the solution, and hence, you need to add more of lime solution to the mixture till you get no more brown deposit on the iron surface.

Bordeaux mixture has protective properties. You can use it even before the disease actually appears on the crop.

Do not apply Bordeaux mixture during the rains or on a very hot day.

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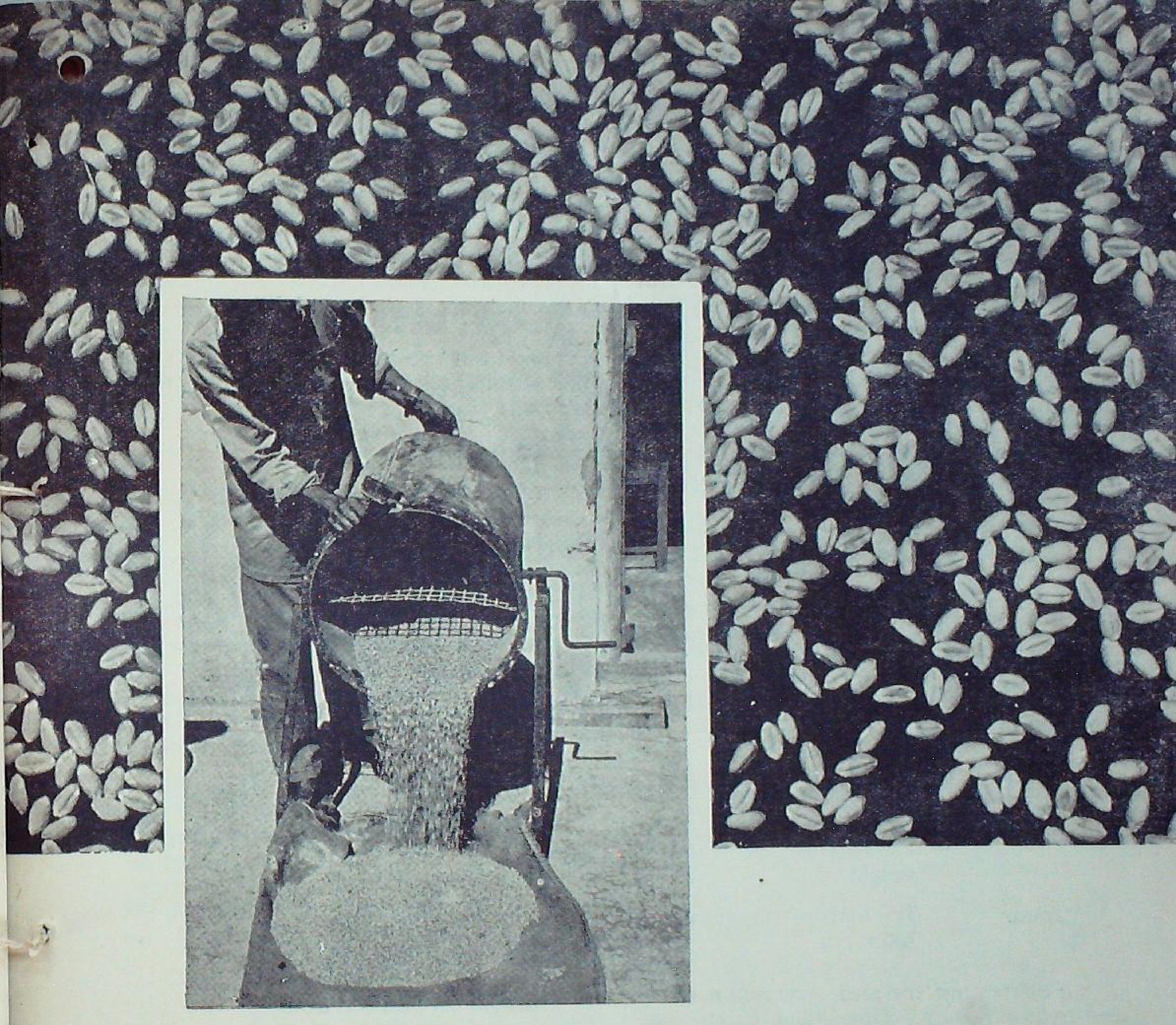


# TREATED SEED *will lead to a disease-free crop*

SOWING time is here again; but, have you had the seed for sowing treated? If not, you should. For, you cannot allow your money and effort to go waste.

In many cases, the germs of crop diseases are carried by the seed itself. These germs kill the seed before it can come up or attack the growing plant and cause heavy crop losses. Such diseases are bunt (stinking smut or *gandam ki badbudar kangiari* or *kalehun*), flag smut (*patton ke kangiari*), and foot rot of wheat, covered smut, leaf spot and stripe diseases of barley, grain smut of *jowar* and angular leaf spot of cotton, etc.

Treating the seed with a suitable chemical will make your seed free from such

diseases. And disease-free seed means good germination and a better start for your crop. It also gives protection to the germinating seed from the attack of organisms found in the soil. You can harvest a much bigger yield and you know that higher yield will reduce your crop cost and fetch you extra profits. You can also thus gradually bring down the disease incidence on your crops in subsequent years.

A number of chemicals are used these days for treating seeds against seed-borne diseases. You may be already familiar with some organo-mercurial compounds, colloidal copper compounds, sulphur and the like for treating seeds.

Get the seed treated two to three days before sowing. Treat only the quantity you will need for your land and avoid treating more seed than you require. For you should not use the surplus for food or feeding to your animals. Here are the doses and the fungicides recommended for treating a maund of each crop seed :

| | |
|---|---|
| Wheat<br>Barley<br>Paddy<br>Cotton | 8 *tolas* of Agrosan 'GN' or Ceresan (or one part of the chemical for every 400 parts of the seed by weight). |
| *Jowar* | Ten *tolas* of sulphur dust, 300 mesh. |

For treating the seed, you will need a seed-treating drum. One such drum can treat 15 maunds of seed in eight hours. But if you are to treat a smaller quantity you can also use an earthenware *chattie* or *ghara* or an ordinary drum with a tight-fitting lid instead.

Before treating, see that the seed is well-dried. Fill the container only two thirds with seed ; for, complete filling will not allow proper mixing of the fungicide with the seed. Add the required quantity of fungicide to the seed and close the lid tight. Rotate the drum slowly or shake the pot vigorously for five minutes. If you are treating the seed in an ordinary drum, roll it on the ground. Now every seed will have a fine layer of the chemical dust all over. Empty the seed and store in an air-tight container in a dry place.

While treating the seed, take all the precautions that you are told by your Gram Sevak or the Plant Protection Officer as these chemicals are harmful to you.

You can also avoid the attack of some other serious crop diseases if you follow these cheap and effective measures.

#### FLOATATION METHOD

Wheat gets a disease called 'earcockle' (*tandu* or *mami*). To free the wheat seed of this disease, treat it this way :

Fill a container with water and put the seed in it. Stir well and keep for a few minutes. The bad seeds will float on the surface of water and healthy grains will settle down at the bottom. Remove all floating seeds and galls and burn them. Drain out the water, dry the seed well, and store.

#### SOLAR TREATMENT

Treating the wheat and barley seed by solar method is a good way of controlling loose smut disease attacking these crops. This is done in the plains during the months of May and June when temperatures are high.

This is how you can do it.

Soak the seed in water early in the morning, say, at 8 a.m.

Remove the seed from water at 12 noon.

Now spread the seed in a thin layer in the sun, preferably on a *pucca* floor for drying.

When completely dry, bag it and store for use in the next season.

Better ensure a rich harvest by treating the seed before sowing in this *rabi*.

# MAKING THE FUEL BILL

## JUST TWO RUPEES A MONTH

By PADMASINI ASURI

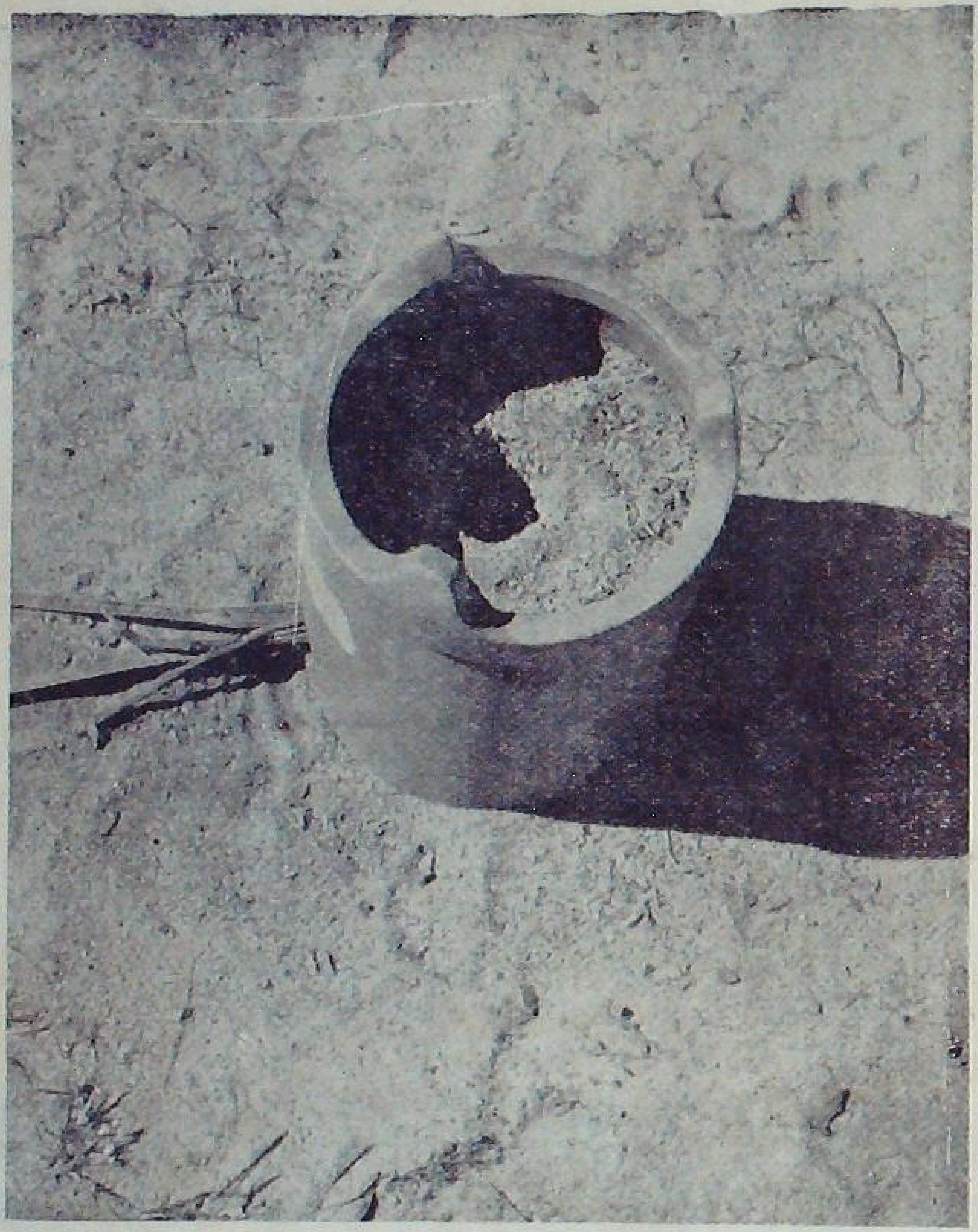
MANY home-makers, bothered with the high cost of fuel, are looking for ways of bringing down the monthly fuel bill. Some have changed from using firewood to kerosene for their cooking. With this change in fuel, they now spend less.

There is a still cheaper fuel which many do not know they can use. It is sawdust. To use sawdust, however you need a special type of oven of baked clay or tin. But it is easy to make.

This oven (shall we call it the sawdust stove ?) is cylindrical in shape, with a small circular opening at the lower part of the wall, and also a round rim at the top.

*Step 1. Take two poles. Hold one at the centre of the stove, and insert the other through a side opening*

*Step 2 Take handfuls of moistened sawdust and pack around the vertical pole*



*Step 3. Remove both the poles and you will have an L-shaped air passage. The stove is now ready for use*

This is how you prepare the stove for using sawdust as fuel.

Take two firewood poles. Hold one at the centre of the stove. Insert the other into the opening at the side. Moisten slightly the heap of sawdust with water. Take handfuls of the moistened sawdust to pack around the straight rod. Press the sawdust hard now and then. Fill up to the brim of the stove.

When the sawdust reaches the brim, remove the pole. You will now see a circular hollow wall surrounded by a wall of sawdust. Remove the bottom pole also, and you will have an L-shaped air passage. The stove is now ready for lighting.

**USING THE STOVE**

Insert some firewood sticks into the side passage, and light the oven. The flame will reach the top through the opening in the middle Keep a vessel on the top brim, and do your cooking. The fire is slowly kindled by the sawdust packed around. There will be no need for refuelling the stove for at least two hours.

To make the stove work well, pack the moist sawdust firmly. Otherwise, the sawdust wall will fall off and block the air passage. You will then have trouble with smoke.

Keep the kitchen windows open for allowing the smoke to escape and for free ventilation.

Plan your cooking and have all the materials near the stove, since you cannot regulate the flame.

People who have tried this sawdust stove say, they spend two rupees a month on the fuel needed for cooking, as against five rupees they used to spend on firewood.

A baked clay stove costs only 50 nP. A village potter can easily make one for less from clay.

Sawdust, of course, is cheap.

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